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SCIENTIFIC EXPERIMENT

Large-scale Scientific Experimental Work

by

Ch'ien Hsüeh-sen (钱学森)

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Chairman Mao's enunciation that class struggle, production struggle, and scientific experiment are the three great revolutionary movements for building a powerful socialist country is the most cogent and perspicacious summation of the contemporary activities of mankind. Scientific experimental activity is a more modern phenomenon that came much later than the class struggle and production struggle of mankind. However, the scope and magnitude of scientific experiments are ever expanding, and are expanding at an ever faster rate. This statement is true not only in terms of the absolute quantity of manpower and material power, but also in comparison with production struggle and in terms of relative quantity. Chairman Mao drew the profound and wise conclusion that scientific experiments should be placed on the same level with class struggle and production struggle after he analyzed modern science and technology.

The sphere of scientific experiment is very broad. It includes the tests carried out by man in conjunction with productive labor, and the diverse inquiries and experiments for the improvement of technology and production. Most people participate in this field of work. This kind of scientific experimental work is carried out on a small scale by the production teams of people's communes and the workshops of factories. The work has a mass character. This aspect of work does not necessarily call for the use of precision instruments or the guidance of very profound scientific theories. But it is closely connected with the realities of production. People who participate in this kind of work also directly participate in labor. They go deep into the first line of the front, and are best able to observe the natural laws in the process of production. Therefore, these scientific experiments of the masses have a great role to play and yield considerable results. They constitute an important aspect of scientific experiment.

We must also perceive that although contemporary natural sciences have been developed to a high degree and their theoretical systems are rather perfect, yet it should be said that we have not mastered all the mysteries of nature, and we have

not discovered all the laws governing the movement of matter in nature. Therefore, the scientific experiments of the masses which are not confined by scientific theories are more able to break through the known boundaries and to discover things unknown before. The discovery of the high-yield law of paddy rice by Ch'en Yung-k'ang, an outstanding innovator of agricultural techniques in China, and the pneumatic metal-cutting technology of welder Li Kuei are cases in point. To be sure, these discoveries can only emerge from a lot of work and the work of many people. But once a new law is discovered, it gives man new knowledge of the objective world, and is therefore most valuable. In our country, the inventions of the working people will never be buried in oblivion. It is therefore said that the development of mass scientific experiments is of significance.

At the initial stage in the development of science and technology, the whole undertaking was very small in scale, and there were few people engaged in scientific research. They were assistants to specialized scientists and scientists. At that time, every experiment in scientific research was taken up by only a few persons. The equipment used was also rather crude. It was not much different from the equipment which we now use for giving instructions in secondary schools, or probably even cruder. This we can see from the laboratories of the well-known scientists still preserved, or the pictures showing the circumstances in which some scientists worked. They made use of such equipment to lay down the foundation of modern science and technology. Why were the achievements they made so great although they had only crude equipment? We can of course say that these famous scientists were brilliant. But the more important reason was that science was still in its infancy at that time, and was more or less rudimentary. Natural things were not very carefully analyzed and dissected, and as a consequence, tools which were rather crude could meet the need.

Even today, crude equipment and instruments, besides being used in mass scientific experiments, are still also used in some rather important scientific and theoretical work. For example, apart from paper and pen, botanical and zoological taxonomists need collecting tools, magnifying glasses and a rich store of specimens in research. These also cannot be described as complex equipment. There are some scientific problems which can be considered as the most "pioneering." For example, it is necessary to determine whether there are outside the earth or the solar system living things like those on the earth. One kind of laboratory work to solve this question of cosmic biology is to collect meteorites from outer space. These meteorites are then cut apart in very clean working environment to insure that the inner part of the meteorites is not "contaminated" by biological matter on the earth. Samples are next taken for analysis to see whether the inner part of the meteorites contains traces of biological matter, or the vestiges of organic matter composed of atoms of carbon, hydrogen, oxygen and nitrogen. If such traces are present, and if it can be proved that this is not due to contamination after the meteorites fell on the earth, then it can be shown that there may also be living things like those on the earth in outer space many billions of miles away. Such work also does not need very complicated equipment.

It can thus be seen that even for specialized scientists, the study of very important scientific problems does not necessarily call for the use of complex equipment. The problems they study are greatly different from those at the early stage of scientific development, but they inherit the material conditions for research at the initial stage, namely, one or two workrooms, some crude tools, several assistants working under a scientist, plus a library and a filing room. The scientists engaged in such work also work diligently to develop the new sphere of science and technology, and constitute an important force among the scientific ranks.

However, what we must especially describe here is not this kind of small-scale scientific experimental work, but large-scale scientific experimental work clearly marked by the characteristics of modern science and technology. Experimental work in modern science and technology calls for careful analysis and dissection of natural phenomena, and hence it is necessary to make use of suitable fine tools